Update on
light attenuation studies in Qscan

Alessandra, Silvestro

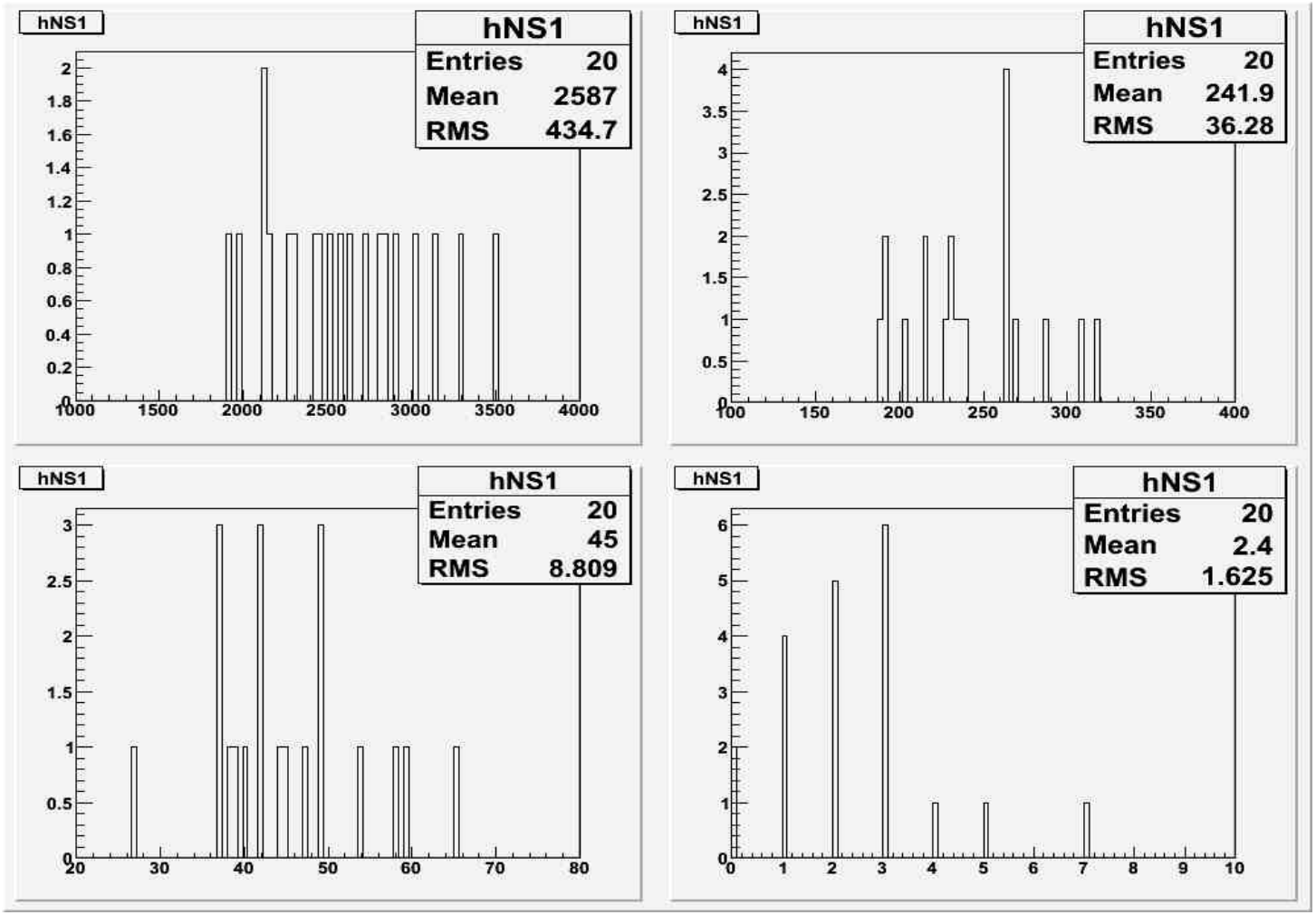
SB 27/07/2016

Updates

- The 112 muons in the sample are hitting a $8x8x8m^3$ volume, only 71 are entering the fiducial volume => the efficiencies we presented last time should be rescaled (sorry, I didn't think the absolute value was the question)
- The tagging algorithm on Σ_{PMT} has been slightly tuned (but is still not perfect)
- We have implemented the Poisson fluctuations after absorption correction (as suggested by Slavic) => integer number of photons
  - This made us realize that grouping the time bins, as we did for λ_{Abs}=2m and 1m, was impacting the selection algorithm and causing the loss in efficiency that was not intuitive
- We didn't have time to optimize other selection algorithms, based for example on single PMTs (we expect them to help for particular positions or directions of the muons, probably not much on the overall efficiency)

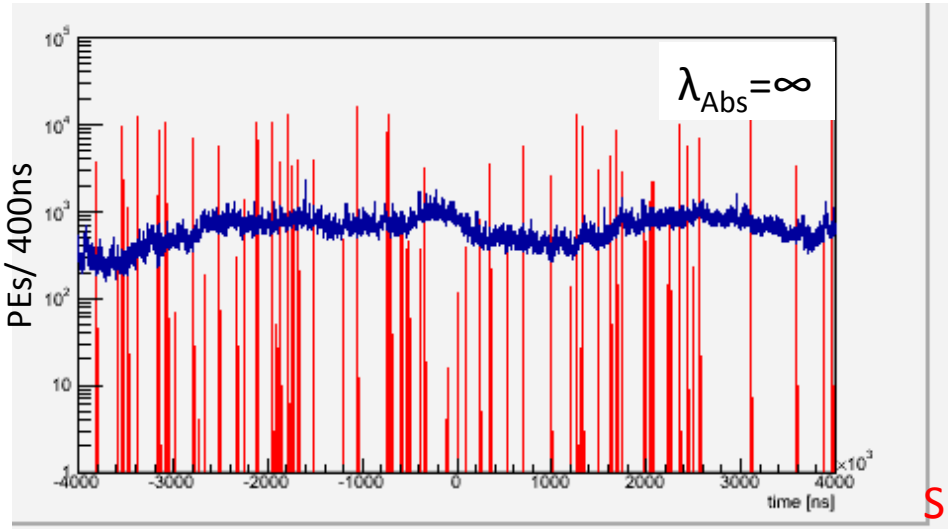
1 GeV beam electrons

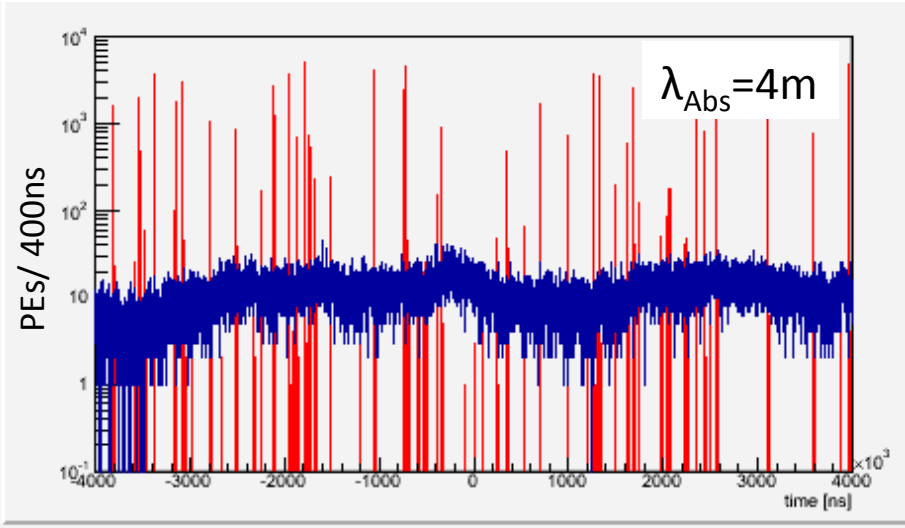
Consistency plot requested by Hasegawa-san



(Note: fully consistent with plots on 1-GeV and 5-GeV pions shown at SB on 06/07)

Muon bkg in 8 ms (LEM G=300), sum of 36 PMTs

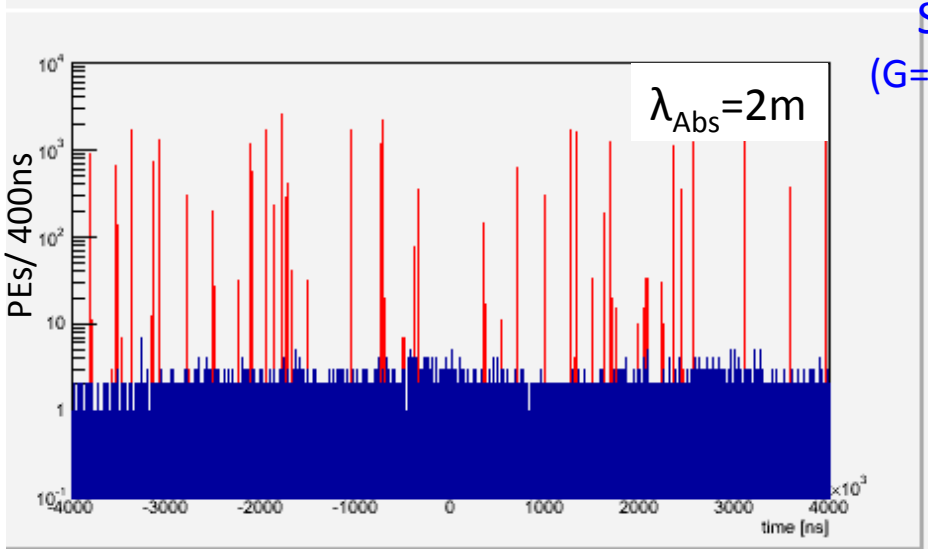


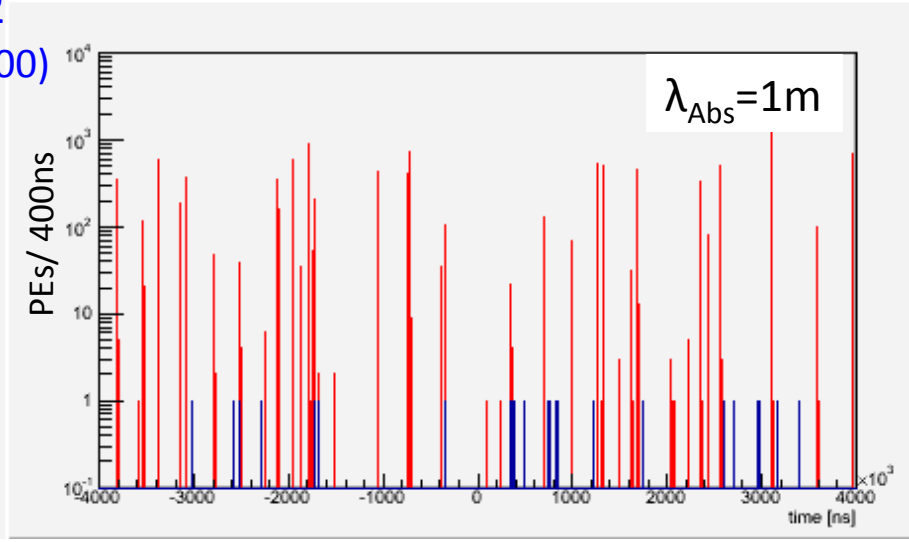


S1

S2

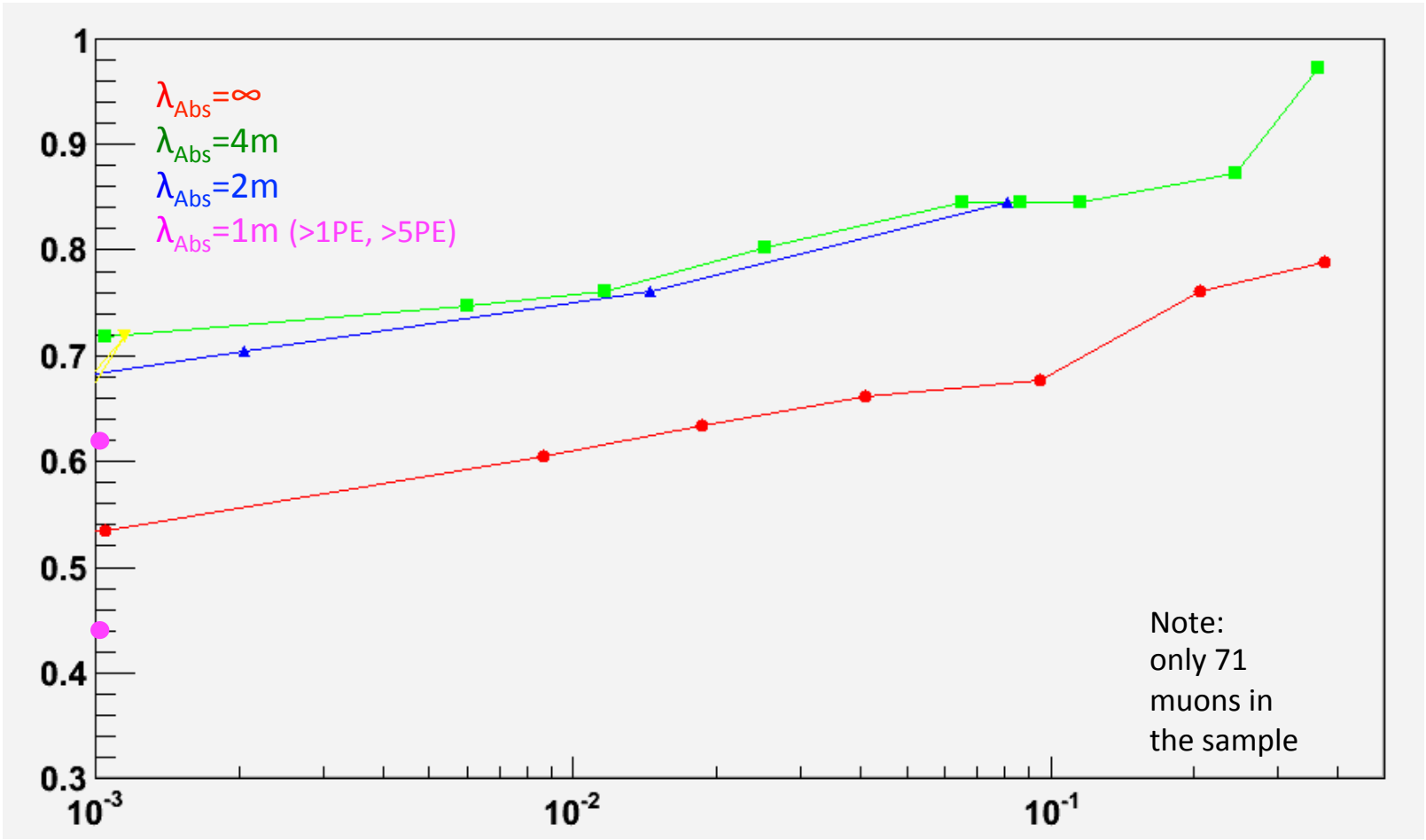
(G=300)





Muon S1 tagging (LEM G=300), sum of 36 PMTs

With “Marie’s method” (a simple threshold)

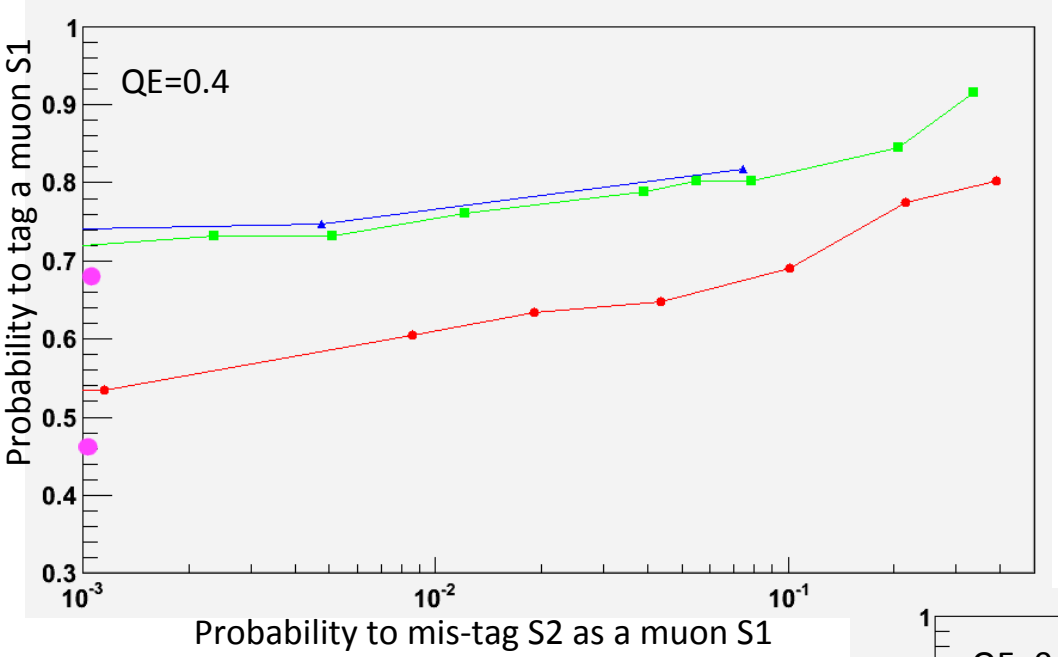


Muon tagging and coverage

- We would like to simulate the effect of larger PMT coverage, without having dedicated light maps
- So we changed the QE of the PMTs from 0.2 to 0.4 and 0.1 (just a proxy…)

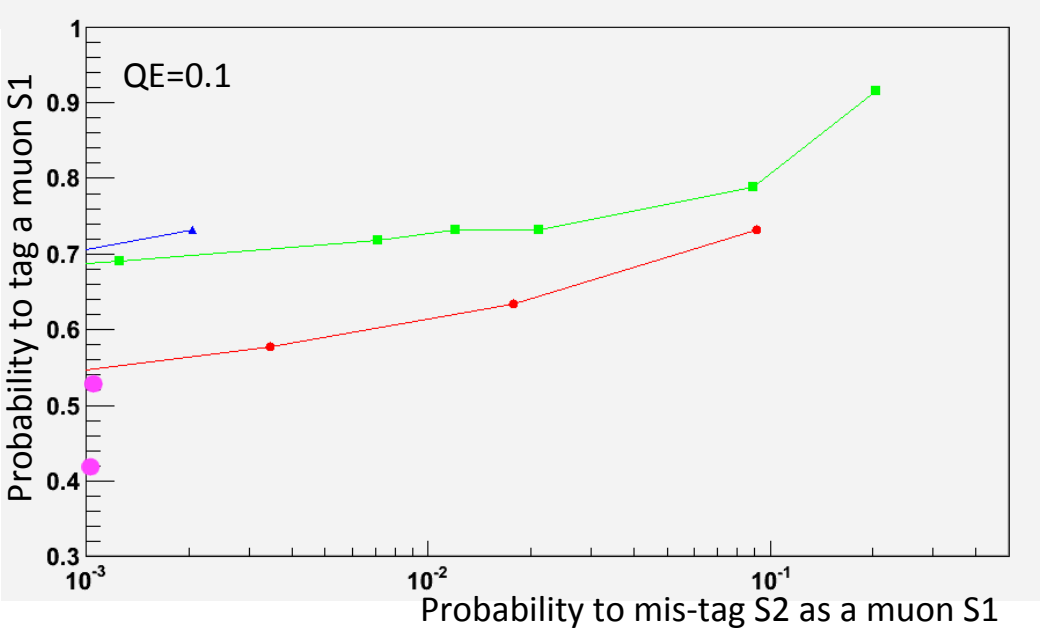
- A good option would be using the light-maps with 144 PMTs were produced by Silvestro last year. We tried, but the code takes too long to run: we are investigating why.

Muon tagging and coverage

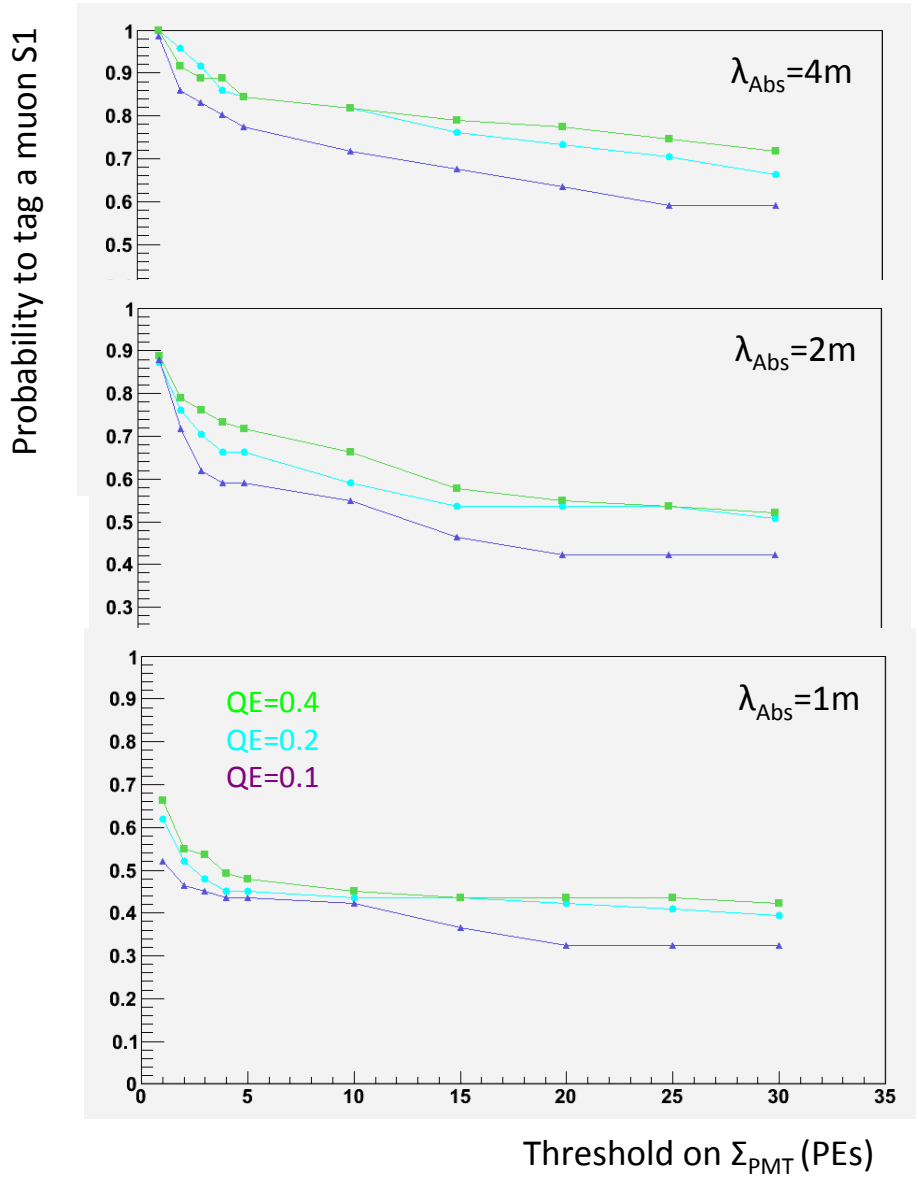


$\lambda_{Abs}=\infty$
$\lambda_{Abs}=4m$
$\lambda_{Abs}=2m$
$\lambda_{Abs}=1m$ (>1PE, >5PE)

Should we consider other sources of background that impose a given threshold ?



Muon tagging and coverage



Should we consider other sources of background that impose a given threshold ?